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Hochstein

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(54) **LIGHT EMITTING ASSEMBLY WITH INDEPENDENT HEAT SINK LED SUPPORT**

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F21V 29/00 (2006.01)

(52) **U.S. Cl.**
USPC **362/294**; 362/373; 362/218; 362/249.02; 362/97.3; 362/545

(58) **Field of Classification Search** 362/612, 362/555, 545, 548, 97.3, 218, 225, 249.02, 362/249.06, 294, 373
See application file for complete search history.

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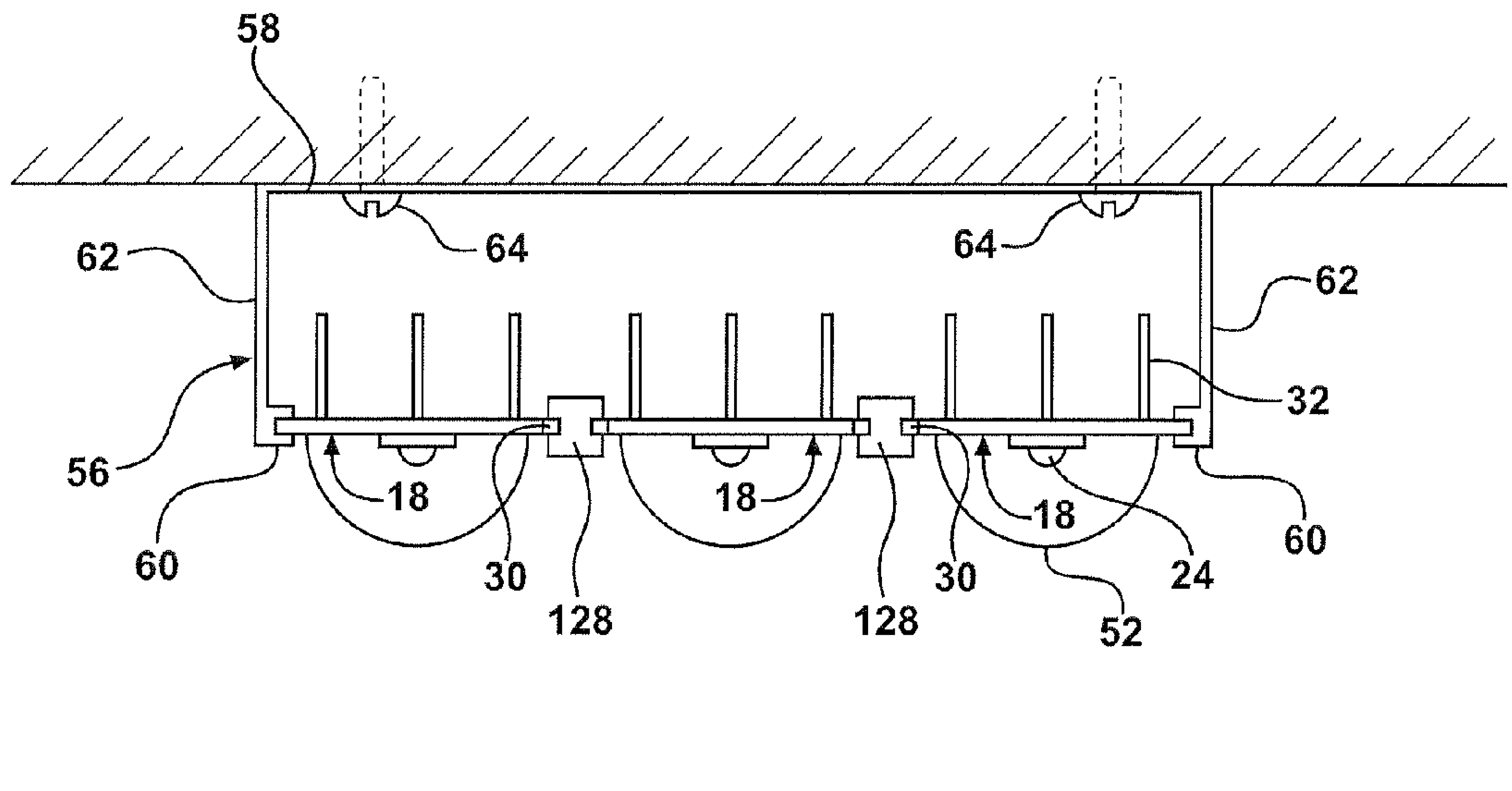
(57) **ABSTRACT**

A light emitting assembly (**10**) is fabricated by forming a continuous strip of aluminum heat sink having a pair of fins (**32**) aligned with the side edges (**20**) and cutting the continuous strip into a plurality of elongated sections (**18**). The elongated sections (**18**) are disposed in spaced and generally parallel relationship to one another and separated by an elongated slot (**26**) so that adjacent elongated sections (**18**) are independent of one another. A plurality of light emitting diodes (**24**) are disposed on the mounting surface (**14**) of each elongated section (**18**). Bridges (**28**) constructed of a material different from the material of the heat sink interconnect the elongated sections (**18**). An independent cover (**52**) is adhesively secured to the mounting surface (**14**) around the light emitting diodes (**24**) on each elongated section (**18**). A housing (**56**) spaced from the fins (**32**) is disposed over the assembly (**10**).

23 Claims, 4 Drawing Sheets



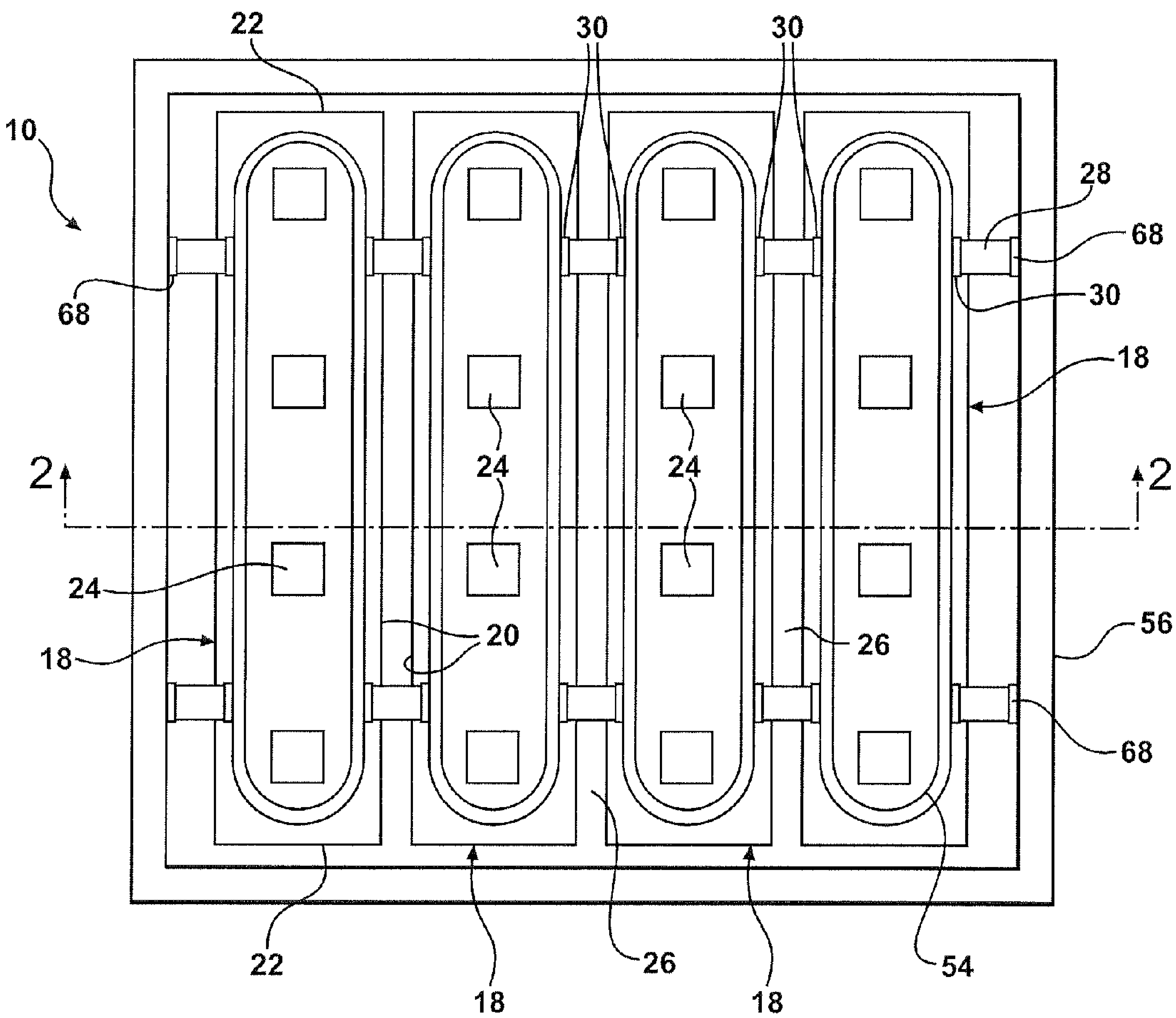


FIG - 1

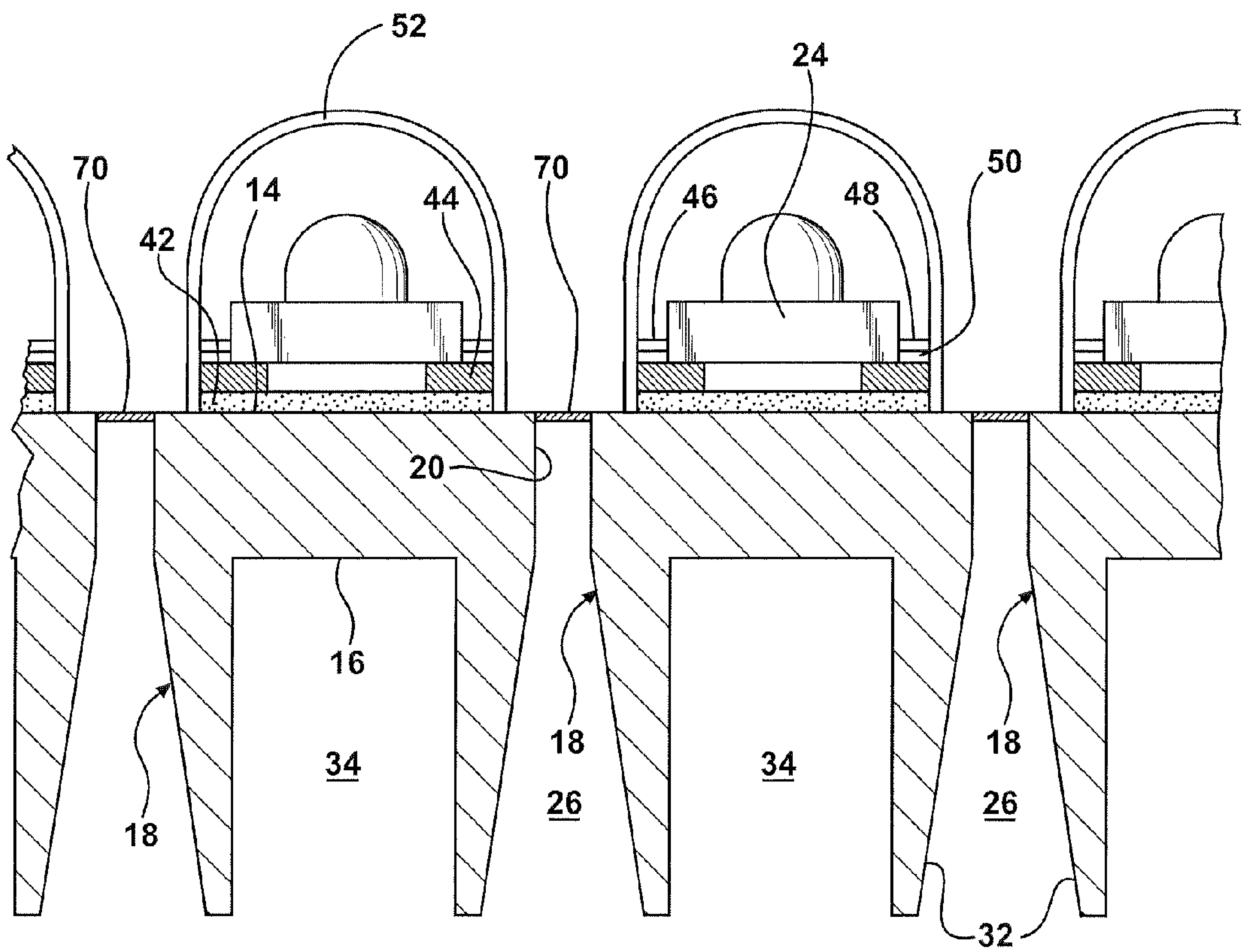
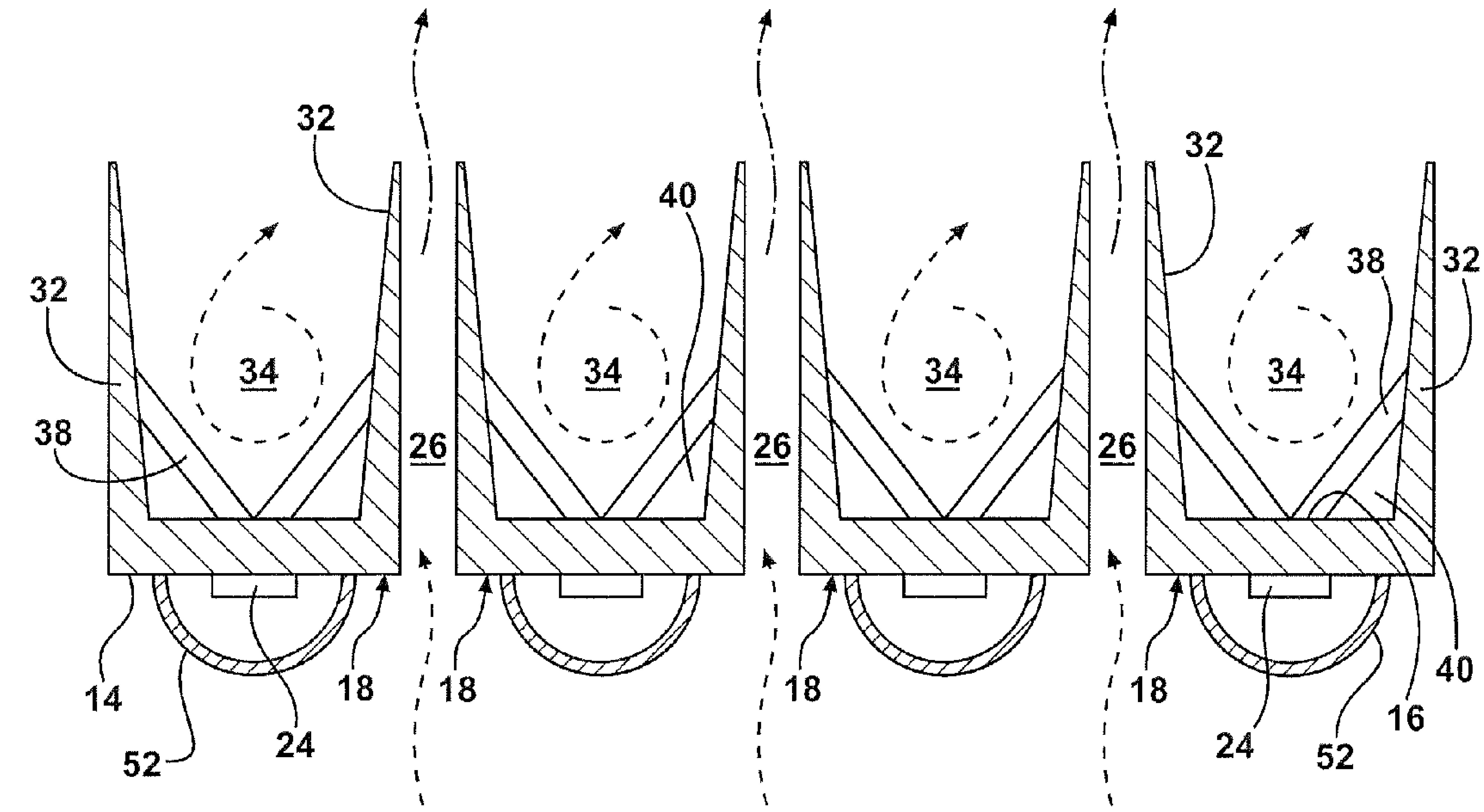


FIG - 2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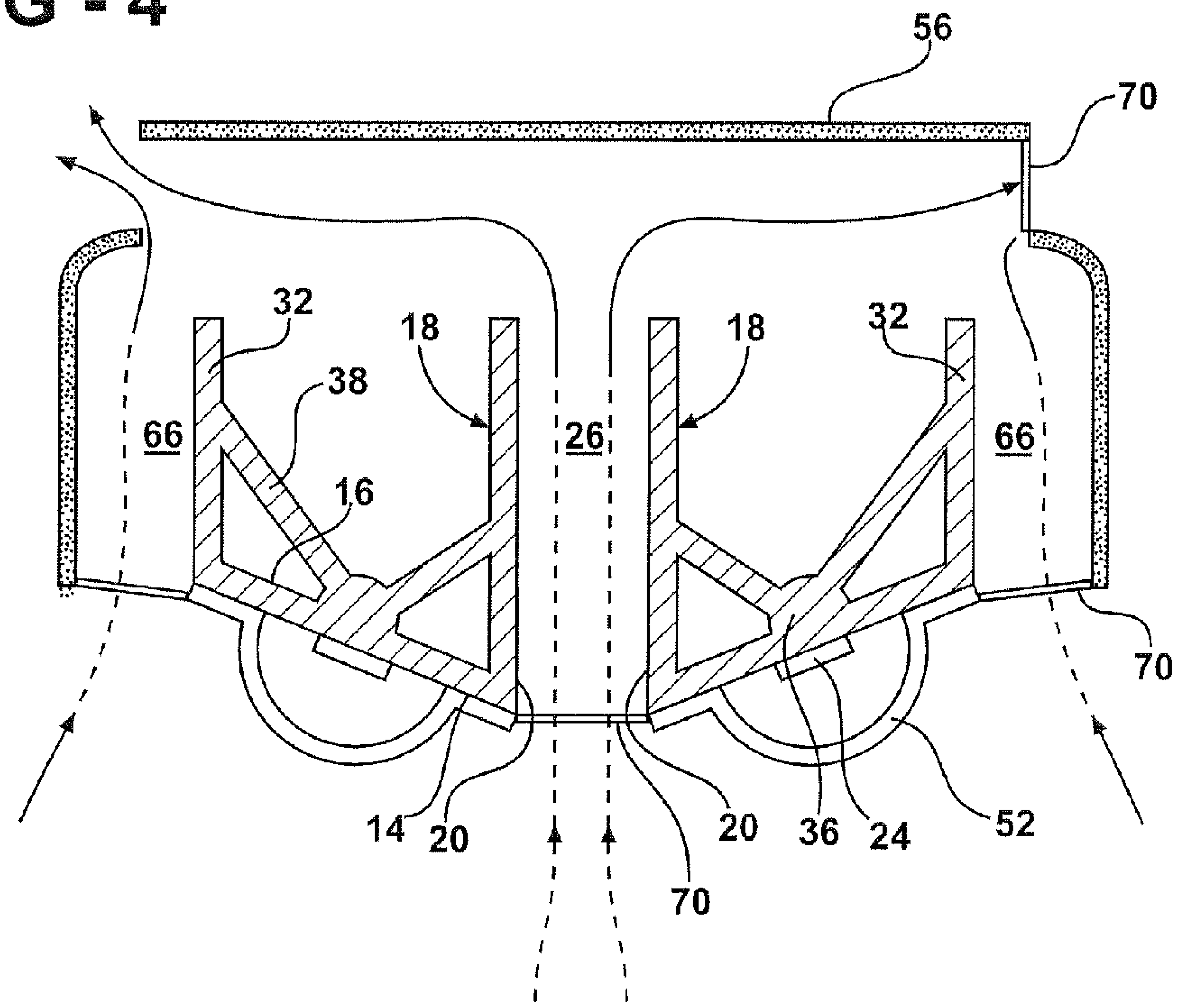
52
16
40

FIG - 3

FIG - 4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18
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52
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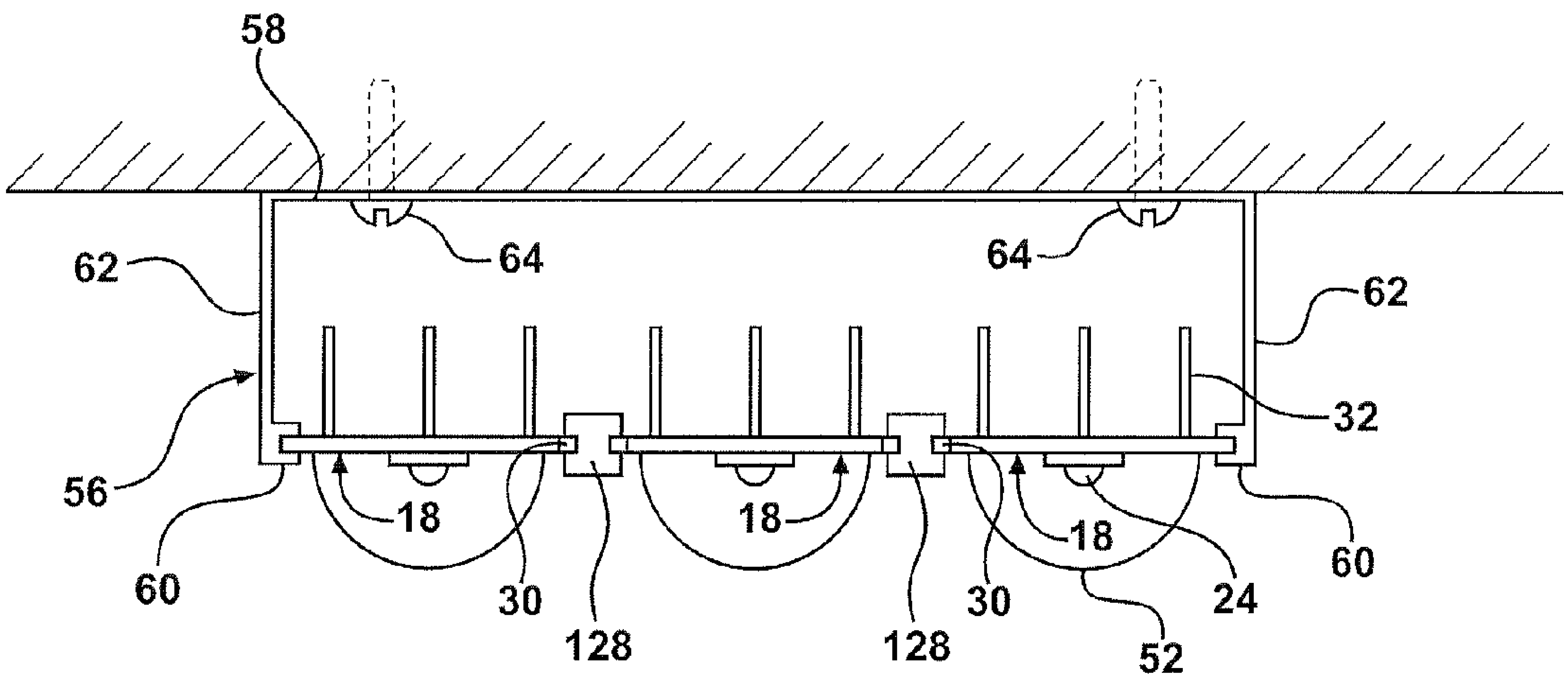
58
62
64
64
62
56
32
18
18
18
24
60
60
30
30
128
128
52

FIG - 5

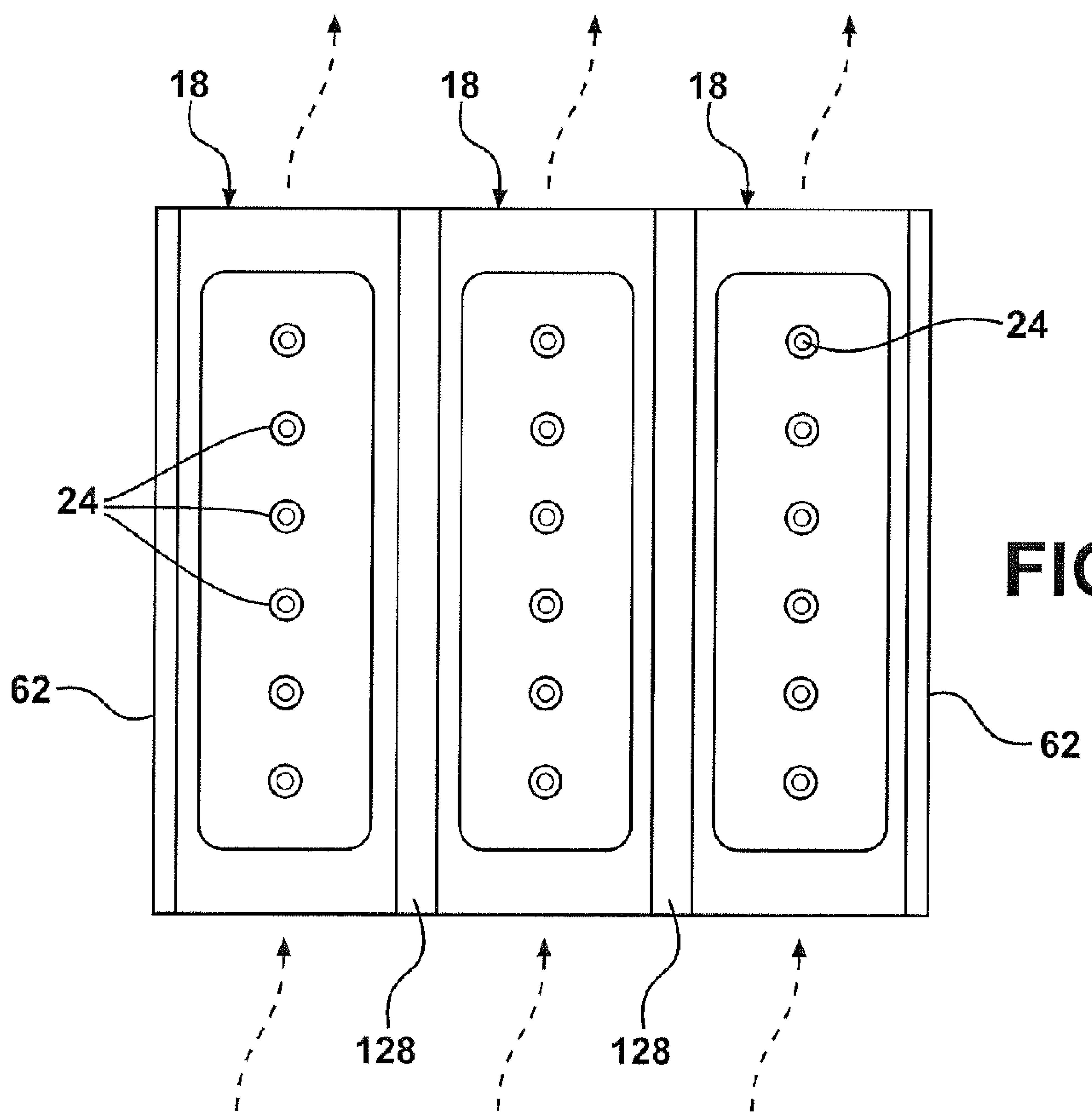
18
18
18
24
24
62
62
128
128

FIG - 6

LIGHT EMITTING ASSEMBLY WITH INDEPENDENT HEAT SINK LED SUPPORT

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a National Stage of International Application No. PCT/US 2008/065874, filed Jun. 5,2008.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The subject invention relates to a light emitting assembly of the type including light emitting diodes (L.E.D.s) and the method of manufacturing such a light emitting assembly.

2. Description of the Prior Art

An example of such an assembly is disclosed in the U.S. Pat. No. 5,857,767 to the present inventor, Peter A. Hochstein. The Hochstein 767 patent discloses a plurality of L.E.D.s disposed on the mounting surface of a heat sink formed by casting. A separate and independent heat sink casting and manufacturing process is required accordingly for each distinct mounting surface configuration and dedicated use.

SUMMARY OF THE INVENTION

The subject invention provides such a light emitting assembly including a plurality of light emitting diodes disposed on the mounting surface of a heat sink defined by a plurality of elongated sections extending between opposite ends. The elongated sections are disposed in generally parallel relationship to one another to present side edges extending continuously between the ends of the elongated sections to separate and render adjacent elongated sections and the L.E.D.s on the mounting surface thereof independent of one another.

The subject invention also provides for a method of manufacturing such a light emitting assembly including the steps of forming a continuous strip of heat sink presenting a mounting surface, dividing the strip into a plurality of elongated sections extending between ends, disposing a plurality of L.E.D.s on the mounting surface of each elongated section, and disposing the elongated sections in generally parallel relationship to one another to present side edges extending continuously between ends of the elongated sections to renders adjacent elongated sections and the L.E.D.s on the mounting surface thereof independent of one another.

ADVANTAGES OF THE INVENTION

A typical application of the thermally efficient L.E.D. assembly of the present invention is in street lamps, traffic signals of all types, message boards, and other large area light emitting assemblies. The subject invention improves manufacturing efficiency and reduces costs because a single forming process, for example extrusion, may generate a heat sink defined by independent elongated sections capable of being arranged in various configurations and having various dedicated uses. The independent elongated sections may be configured so that the L.E.D.s on the mounting surface of adjacent elongated sections are canted with respect to one another in order to achieve a desired optical beam pattern and photometric performance based on the intended use of the assembly. The independent elongated sections may be arranged in various geometries, for example adjacent to one another in a horizontal plane, or spaced from one another to form a 'C' shape. In addition, the fins and ribs of the elongated sections may be formed during a single forming process, which also improves manufacturing efficiency and reduces costs.

BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the present invention will be readily appreciated, as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. **1** is plan (frontal) view of a preferred embodiment of the subject invention;

FIG. **2** is a fragmentary cross sectional view taken along line **2-2** of FIG. **1**;

FIG. **3** is a cross sectional view of a second embodiment taken along line **2-2** of FIG. **1** wherein the elongated sections include side ribs;

FIG. **4** is a cross sectional view of a third embodiment taken along line **2-2** of FIG. **1** wherein the heat transfer surface has an angle other than ninety degrees relative to the parallel fins; and

FIG. **5** is a cross-sectional view of a fourth embodiment of the invention including a vertically mounted housing: and

FIG. **6** is a plan (frontal) view of the embodiment of FIG. **5**.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the Figures, a light emitting assembly **10** is generally shown. The light emitting assembly **10** comprises a thermally conductive heat sink defined by a plurality of elongated sections **18**. The heat sink is preferentially made of metal, such as a homogeneous aluminum or an aluminum alloy. The heat sink is formed to present a mounting surface **14** and an oppositely facing heat transfer surface **16** and then divided into the plurality of elongated sections **18**. The elongated sections **18** are disposed in generally parallel relationship to one another to present side edges **20** extending between the ends **22** of the elongated sections **18**. The elongated sections **18**, as shown in FIG. **1**, each have the same length, width, and thickness. However, each of the elongated sections **18** may have lengths, widths, and thicknesses that differ from those shown and from one another. In addition, the elongated sections **18** may be canted at angles to direct light from the L.E.D.s **24** thereof in various different directions to achieve a desired optical beam pattern and photometric performance based on the intended use of the assembly **10**. The elongated sections **18** are preferably formed by extrusion, but may be formed by forging, casting, or the like.

The elongated sections **18** may be placed directly in engagement with one another, as shown in FIGS. **5** and **6**. However, in the preferred embodiment of the present invention, the elongated sections **18** are spaced from one another so that the side edges **20** of adjacent elongated sections **18** define an elongated slot **26** extending continuously along the side edges **20** between the ends **22** of each of the elongated sections **18**. Each of the elongated slots **26** separates and renders adjacent elongated sections **18** and the L.E.D.s **24** on the mounting surface **14** thereof independent of one another, as shown in FIG. **1**. The elongated slots **26** enhance the convective cooling of the assembly **10** by allowing ambient air to pass by each of the independent elongated sections **18** . The elongated slots **26** are shown as each having the same length and width.

The assembly **10** includes at least one bridge **28**, **128** but preferably a pair of bridges **28**, **128** spaced and parallel to one another and extending transversely to each of the elongated slots **26**, as shown in FIG. **2**. In the preferred embodiment, the bridges **28**, **128** separate adjacent elongated sections **18** by the elongated slots **26** and interconnect adjacent elongated sections **18**. Alternatively, the bridges **128** may comprise a strip disposed between adjacent elongated sections **18** and extending continuously between opposite ends **22** of the elongated sections **18**, as shown in FIG. **5**. In the preferred embodiment, the bridges **28**, **128** are independent of the elongated sections **18** and comprise a material different from the material of the heat sink. In FIG. **1**, the bridges **28** are shown as extending transverse to the elongated slots **26**, but they may extend at other angles relative to the elongated slots **26**. The bridges **28**, **128** are securely connected to each of the elongated sections **18** by a plurality of bridge connectors **30** so that the elongated sections **18** may be held in a fixed position. The bridge connectors **30** may be one of many possible adhesives or mechanical connectors, such as a nut and bolt or a screw.

Each of the elongated sections **18** include a plurality of fins **32** extending transversely from the heat transfer surface **16** and disposed in spaced and parallel relationship to one another. The fins **32** extend continuously between the ends **22** of each of the elongated sections **18** to present a first void space **34** between adjacent fins **32**. The fins **32** are open at the ends **22** for exposing the first void space **34** between adjacent fins **32** to air. The fins **32** are designed to enhance the transfer of heat away from the heat sink to surrounding ambient air. In the preferred embodiment, one of the fins **32** is aligned with each of the edges **20** so that each of the edges **20** and associated aligned fins **32** present a continuous surface adjacent to each of the elongated slots **26**, as shown in FIG. **2**. Alternatively, the fins **32** may be discontinuous or perforated to enhance convective cooling. They may extend at other angles relative to the heat transfer surface **16** and may be placed in other positions relative the elongated slots **26**. The fins **32** may also have different cross sectional shapes than those shown

The heat transfer surface **16** may also include a longitudinal rib **36** extending continuously into the first void space **34** and longitudinally between the ends **22** of each of the elongated sections **18**, as shown in FIG. **3**. Each elongated section **18** may also include a pair of side ribs **38** each extending longitudinally between the ends **22** of each of the elongated sections **18**. The side ribs **38** extend radially from the heat transfer surface **16** to the fins **32** to present a second void space **40** between the heat transfer surface **16** and each of the side ribs **38** and the fins **32**. The additional ribs **36**, **38** are designed to enhance the heat transfer of heat away from the heat sink to surrounding air. Although the ribs **36**, **38** are shown as described above, they may comprise different shapes and extend at other angles relative to the heat transfer surface **16**.

An alternative embodiment of the invention includes the heat transfer surface **16** being disposed at an angle other than ninety degrees relative to the parallel fins **32** thereof, as shown in FIG. **4**. The independent elongated sections **18** allow the heat transfer surface **16** of adjacent elongated sections **18** to be disposed at angles different from one another so that light from the L.E.D.s **24** may be directed in more than one direction to achieve a desired optical beam pattern and photometric performance. Elongated sections **18** comprising a single heat transfer surface **16** configuration are capable of directing light in different directions by disposing the heat transfer surfaces **16** of adjacent elongated sections **18** at angles opposite one another, as shown in FIG. **4**.

The assembly **10** includes an electrically insulating coating **42** disposed over the mounting surface **14**. The coating **42** is less than one thousand microns thick, but preferably less than three hundred microns thick. The coating **42** may be continuous and cover the entire mounting surface **14**, or it may be disposed in circuitous tracks separated from one another by the bare metal of the respective elongated section **18**.

Circuit traces **44** are disposed in spaced lengths from one another on the mounting surface **14** to prevent electrical conduction between the traces **44**. The traces **44** extend in end to end relationship along at least one of the elongated sections **18**. The coating **42** prevents electrical conduction from each of the traces **44** to the heat sink. The traces **44** may consist of a polymetric material having metal particles dispersed therein, such as an expoxy compound with a noble metal, or a phenolic resin compounded with either copper, silver, or nickel.

A plurality of L.E.D.s **24** are disposed on the mounting surface **14** to span the spaces between the ends of adjacent traces **44**. Each one has a positive lead **46** and a negative lead **48** being in electrical engagement with the adjacent ones of the traces **44** to electrically interconnect the traces **44** and the L.E.D.s **24**. The L.E.D.s **24** are disposed in the spaces between adjacent traces **44** on each one of the elongated sections **18**. An electrically conductive adhesive **50** secures the leads **46**, **48** of the light emitting diodes **24** to adjacent ones of the circuit traces **44**. The L.E.D.s **24** on each of the elongated sections **18** may be electrically interconnected in series with one another and electrically interconnected in parallel with the ones on other elongated sections **18**. The L.E.D.s **24** on each of the elongated sections **18** are shown as being disposed parallel to one another and having a uniform space between each adjacent light emitting diode **24**. However, the plurality of L.E.D.s **24** on each elongated section **18** may be disposed in a non-parallel alignment relative to the L.E.D.s **24** on adjacent elongated sections **18**, and the individual L.E.D.s **24** may have non-uniform spaces between one another. The electrical components of the assembly **10** are connected with printed, foil or wire conductors, and the conductor feed-throughs must be sealed when the assembly **10** is used outdoors.

The assembly **10** includes plurality of independent covers **52**, with each cover **52** being disposed over one of the elongated sections **18** so that one cover **52** independently covers **52** the L.E.D.s **24** on each of the elongated sections **18**. The independent covers **52** are light transmissive and formed of a glass or plastic material, such as polycarbonate. The independent covers **52** protect the L.E.D.s **24** and electrical components from precipitation, debris, sunlight, and other harmful effects that would be detrimental to the operation of the assembly **10**. Each cover **52** defines a periphery **54** being in sealed engagement with the mounting surface **14** around the traces **44** of the L.E.D.s **24** without obstructing the ability of air to flow through the plurality of elongated slots **26** between the elongated sections **18**. Although the covers **52** are shown as having similar lengths, widths, and cross sectional shapes, they may have lengths, widths, and cross sectional shapes that differ from those shown and from one another. The cover **52** is attached to the respective elongated section **18**, such as by an adhesive material, like RTV silicone rubber. Other attachments may be used such as double faced foam tape or a replaceable gasket.

The assembly **10** also includes a housing **56**, shown in FIG. **4**, covering and spaced from the heat transfer surface **16** of the heat sink to allow convective air flow over the fins **32**. In one embodiment of the present invention, the housing **56** is designed for vertical mounting and includes a back wall **58** extending between open housing ends **60** and side walls **62** extending transversely from the back wall **58** to the elongated sections **18** to define a U-shape in cross section **18** extending between the open housing ends **60**, as shown in FIG. **5**. When the housing **56** is vertically mounted, as shown if FIGS. **5** and

6, mounting anchors **64** may extend through the back wall **58** of the housing **56** to connect the housing **56** to a vertical surface. The back wall **58** is spaced from the heat transfer surface **16** and fins **32** to permit advantageous convective air flow vertically over fins **32** and through the vertically mounted housing **56**.

The housing **56** is designed to shield the elongated sections **18** from precipitation, debris, and other harmful effects that would be detrimental to the assembly's **10** operation. The housing **56** also shields the elongated sections **18** from sunlight, which reduces the temperature of the assembly **10**. It may consist of a thermophastic, vacuum formed polyester [TPO] material, a molded polycarbonate, or a metal material such as stainless steel, for corrosion protection. The housing **56**, as shown in FIG. **4**, includes two hot air vents **66** for allowing ambient air to pass through the housing **56**. However, it may include even more hot air vents **66** or none at all. The housing **56** is secured to the assembly **10** with at least one housing connector **68**, such a spring clip. Other types of mechanical connectors or adhesives may be used.

A screen **70** is be disposed over each of the elongated slots **26** to prevent insects, leaves, and other debris from clogging the elongated slots **26** and impeding the convective air flow through the elongated slots **26**. A screen **70** may also be disposed over the vents **66** in the housing **56**.

The subject invention also includes a method of manufacturing the light emitting assembly **10** including a heat sink defined by a plurality of elongated sections **18** preferentially of thermally conductive aluminum material and each presenting a mounting surface **14** and an oppositely facing heat transfer surface **16** and a plurality of fins **32** extending transversely from the heat transfer surface **16** and disposed in spaced and parallel relationship to one another. As alluded to above, the method comprises the step of forming a continuous strip of heat sink of thermally conductive material having a cross section presenting the mounting surface **14** and the oppositely facing heat transfer surface **16**. The heat sink is also formed to have a plurality of fins **32** extending transversely from the heat transfer surface **16** and disposed in spaced and parallel relationship to one another to present a first void space **34** between each pair of fins **32**. The elongated sections **18** are usually formed by an extrusion process. Other forming means may include casting, roll forming, stamping, bending or drawing processes.

The fins **32** may be formed integrally with and of the same material and by the same process or simultaneously with the extruded elongated sections **18**. Alternatively, they may be formed of a different material and non-simultaneously with the elongated sections **18**.

The method of manufacturing may involve extruding or forming the heat transfer surface **16** on each of the elongated sections **18** at an angle other than ninety degrees relative to the parallel fins **32** thereof. The forming may also involve extruding a pair of side ribs **38** extending radially from the heat transfer surface **16** to the fins **32** to present a second void space **40** between the heat transfer surface **16** and each of the side ribs **38** and the fins **32** and extending longitudinally between the ends **22** of each of the elongated sections **18**. Alternatively, the method may comprise forming the side ribs **38** independently of the extruding and then connecting the post-formed ribs **36**, **38** to the elongated sections **18**. The fins **32** may also be formed integrally with and of the same material and by the same process or simultaneously with the elongated sections **18** during an extrusion process. However, the fins **32** may comprise certain shapes that are difficult to extrude, in which case they are formed of a different material and by a different process than the elongated sections **18**.

Next, the strip of heat sink of thermally conductive material is divided into the plurality of elongated sections **18** extending between the ends **22**. The method includes dividing the heat sink into the elongated sections **18** completely independent of one another so that the void space between each pair of fins **32** is open at the ends **22**. The elongated sections **18** are disposed in spaced and parallel relationship to one another and to present side edges **20** defining an elongated slot **26** extending continuously between the ends **22** and along adjacent edges **20** of the elongated sections **18**. If the heat transfer surfaces **16** of the elongated sections **18** are formed at an angle relative to the fins **32**, then the disposing of the elongated sections **18** may be further defined by aligning the heat transfer surfaces **16** of adjacent elongated sections **18** at opposite angles relative to one another.

The method includes constructing bridges **28**, **128** usually independent of or by a different process than the elongated sections **18**. The method next includes interconnecting adjacent elongated sections **18** with the bridges **28**, **128**. In one embodiment, shown in FIG. **1**, the bridges **28** are disposed spaced and parallel to one another and extend transversely across each of the elongated slots **26** to separate the adjacent elongated sections **18** by the elongated slots **26**. Alternatively, the bridges **28** may extend at angles, other than perpendicularly, relative to the elongated slots **26** and sections **18**. The bridges **28**, **128** are connected to the elongated sections **18** with a plurality of bridge connectors **30**, e.g., adhesives **50** or mechanical fasteners.

The method further comprises applying a coating **42** of electrically insulating material over the mounting surface **14** of the heat sink and then disposing a plurality of circuit traces **44** spaced from one another on the coating **42**. A screen printing method may be used to apply the coating **42** and the circuit traces **44** to the heat sink.

The method further comprises disposing a plurality of light emitting diodes **24** on the elongated sections **18** in the spaces between adjacent ones of the traces **44**. The leads **46**, **48** of the light emitting diodes **24** are secured to the traces **44** with an electrically conductive adhesive **50**. The disposing of the light emitting diodes **24** is further defined as electrically engaging the light emitting diodes **24** with adjacent ones of the traces **44** to electrically interconnect the traces **44** and the light emitting diodes **24**. The method also includes electrically interconnecting the light emitting diodes **24** on each of the elongated sections **18** in series with one another and in parallel with the light emitting diodes **24** on all other of the elongated sections **18**. The L.E.D.s **24** are applied with an adhesive **50** as by a mechanical applicator, a stencil, or a robot pick and place machine.

The method further comprises disposing a plurality of independent covers **52** over the elongated sections **18**. One independent cover **52** is securely attached to each elongated section **18** with at least one attachment, such as an adhesive material, like RTV silicone rubber. Finally, a housing **56** is disposed over the assembly **10**. The housing **56** is spaced from the heat transfer surface **16** of the heat sink **12** and fins **32**. The housing **56** is formed as by a vacuum, injection molding, or drawn from thin metal.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings and may be practiced otherwise than as specifically described while within the scope of the appended claims. The use of the word "said" in the apparatus claims refers to an antecedent that is a positive recitation meant to be included in the coverage of the claims whereas the word "the" precedes a word not meant to be included in the coverage of the claims. In addition, the reference numerals in the claims are merely for convenience and are not to be read in any way as limiting.

What is claimed is:

1. A light emitting assembly (**10**) comprising:

a heat sink presenting a mounting surface (**14**),

a plurality of light emitting diodes (**24**) disposed on said mounting surface (**14**),

said heat sink being defined by a plurality of elongated sections (**18**) extending between opposite ends (**22**) and being disposed in generally parallel relationship to one another to present side edges (**20**) extending continuously between said ends (**22**) to separate and render adjacent elongated sections (**18**) and said light emitting diodes (**24**) on said mounting surface (**14**) thereof independent of one another,

at least one bridge (**28**, **128**) interconnecting adjacent elongated sections (**18**) to maintain said elongated sections (**18**) connected together, and wherein said at least one bridge (**28**, **128**) comprises a material different from the material of said heat sink.

2. An assembly (**10**) as set forth in claim **1** wherein said at least one bridge (**28**) comprises a pair of said bridges (**28**) spaced and parallel to one another and extending transversely to said elongated sections (**18**) to interconnect adjacent elongated sections (**18**).

3. An assembly (**10**) as set forth in claim **1** wherein said at least one bridge (**128**) comprises a strip disposed between adjacent elongated sections (**18**) and extending continuously between opposite ends (**22**) of said elongated sections (**18**).

4. An assembly (**10**) as set forth in claim **1** including a plurality of independent covers (**52**) with each cover (**52**) being light transmissive and disposed over one of said elongated sections (**18**) so that one cover (**52**) independently covers said light emitting diodes (**24**) on each of said elongated sections (**18**).

5. An assembly (**10**) as set forth in claim **1** wherein said heat sink presents a heat transfer surface (**16**) facing in the opposite direction from said mounting surface (**14**) and including a plurality of fins (**32**) extending transversely from said heat transfer surface (**16**) of said heat sink for transferring heat away from said heat sink to surrounding air.

6. An assembly (**10**) as set forth in claim **5** including a housing (**56**) covering and spaced from said heat transfer surface (**16**) and said fins (**32**) for shielding said elongated sections (**18**).

7. An assembly (**10**) as set forth in claim **5** wherein said heat transfer surface (**16**) on each of said sections (**18**) is disposed at an angle other than ninety degrees relative to said fins (**32**) thereof.

8. An assembly (**10**) as set forth in claim **7** including at least one bridge (**28**, **128**) interconnecting adjacent elongated sections (**18**) to maintain said elongated sections (**18**) connected together.

9. An assembly (**10**) as set forth in claim **1** wherein said side edges (**20**) of adjacent elongated sections (**18**) define an elongated slot (**26**) therebetween extending continuously along said side edges (**20**) between said ends (**22**) of said adjacent elongated sections (**18**) so that each of said elongated slots (**26**) separates and renders adjacent elongated sections (**18**) spaced from one another.

10. An assembly (**10**) as set forth in claim **9** including at least one bridge (**28**, **128**) interconnecting adjacent elongated sections (**18**) to maintain said elongated sections (**18**) connected together and separating adjacent elongated sections (**18**) by said elongated slots (**26**).

11. An assembly (**10**) as set forth in claim **10** wherein said at least one bridge (**28**) comprises a pair of said bridges (**28**) spaced and parallel to one another and extending transversely to said elongated sections (**18**) and said elongated slots (**26**).

12. An assembly (**10**) as set forth in claim **10** wherein said at least one bridge (**128**) comprises a strip disposed between adjacent elongated sections (**18**) and extending continuously between opposite ends (**22**) of said elongated sections (**18**).

13. A light emitting assembly (**10**) comprising:

a heat sink of thermally conductive aluminum material presenting a mounting surface (**14**) and a heat transfer surface (**16**) facing in the opposite direction from said mounting surface (**14**),

said heat sink being defined by a plurality of elongated sections (**18**) extending between opposite ends (**22**),

each of said elongated sections (**18**) being disposed in spaced and parallel relationship to one another to present side edges (**20**) defining an elongated slot (**26**) therebetween extending continuously between said ends (**22**) and along adjacent edges (**20**) of said elongated sections (**18**) to separate and render adjacent elongated sections (**18**) and said light emitting diodes (**24**) on said mounting surface (**14**) thereof independent of one another,

said heat sink including a plurality of fins (**32**) extending transversely from said heat transfer surface (**16**) and disposed in spaced and parallel relationship to one another for transferring heat away from said heat sink to surrounding ambient air,

said fins (**32**) extending continuously between said ends (**22**) of each of said elongated sections (**18**) to present a first void space (**34**) between adjacent fins (**32**) and open at said ends (**22**) for exposing said first void space (**34**) between said adjacent fins (**32**) to air,

a plurality of bridges (**28**, **128**) interconnecting adjacent elongated sections (**18**) to maintain said elongated sections (**18**) connected together,

said bridges (**28**, **128**) being independent of and comprising a material different from the material of said heat sink,

a plurality of bridge connectors (**30**) securely connecting said bridges (**28**, **128**) to each of said elongated sections (**18**),

a coating (**42**) of electrically insulating material disposed over said mounting surface (**14**) of said heat sink,

said coating (**42**) being less than one thousand microns in thickness,

a plurality of circuit traces (**44**) spaced from one another on said coating (**42**) for preventing electrical conduction between said traces (**44**) so that said coating (**42**) prevents electrical conduction from each of said traces (**44**) to said heat sink,

a plurality of light emitting diodes (**24**) disposed in spaces (**34**, **40**) between adjacent ones of said traces (**44**),

each of said light emitting diodes (**24**) having a positive lead (**46**) and a negative lead (**48**),

said leads (**46**, **48**) of each of said L.E.D.s (**24**) being in electrical engagement with said adjacent ones of said traces (**44**) for electrically interconnecting said traces (**44**) and said light emitting diodes (**24**),

an adhesive (**50**) of electrically conductive material securing said leads (**46**, **48**) to said traces (**44**),

said light emitting diodes (**24**) on each of said elongated sections (**18**) being electrically interconnected in series with one another,

said light emitting diodes (**24**) on each of said elongated sections (**18**) being electrically interconnected in parallel with said light emitting diodes (**24**) on other elongated sections (**18**), at least three of said traces (**44**) extending in end (**22**) to end (**22**) relationship along each of said elongated sections (**18**),

at least two of said light emitting diodes (**24**) disposed in each of the two spaces (**34**, **40**) between said three adjacent traces (**44**) on each one of said elongated sections (**18**),

a plurality of independent covers (**52**) with each cover (**52**) being light transmissive and disposed over one of said elongated sections (**18**) so that one cover (**52**) independently covers (**52**) said light emitting diodes (**24**) on each of said elongated sections (**18**),

each of said covers (**52**) defining a periphery (**54**) in sealed engagement with said mounting surface (**14**) around said light emitting diodes (**24**),

a housing (**56**) covering and spaced from said heat transfer surface (**16**) and said fins (**32**) for shielding said elongated sections (**18**),

said housing (**56**) including at least one vent (**66**) for allowing air to pass through said housing (**56**), and

a plurality of housing connectors (**68**) securely connecting said housing (**56**) to at least one of said elongated sections (**18**).

14. A light emitting assembly (**10**) as set forth in claim **13** wherein said housing (**56**) includes a back wall (**58**) extending between open housing ends (**60**) and spaced from said fins (**32**) and side walls (**62**) extending transversely from said back wall (**58**) to said elongated sections (**18**) to define a U-shape in cross section (**18**) extending between said open ends (**60**) for allowing air to flow along said fins (**32**) and through said housing (**56**).

15. A light emitting assembly (**10**) comprising:

a heat sink presenting a mounting surface (**14**),

a plurality of light emitting diodes (**24**) disposed on said mounting surface (**14**),

said heat sink being defined by a plurality of elongated sections (**18**) extending between opposite ends (**22**) and being disposed in generally parallel relationship to one another to present side edges (**20**) extending continuously between said ends (**22**) to separate and render adjacent elongated sections (**18**) and said light emitting diodes (**24**) on said mounting surface (**14**) thereof independent of one another, wherein said heat sink presents a heat transfer surface (**16**) facing in the opposite direction from said mounting surface (**14**) and including a plurality of fins (**32**) extending transversely from said heat transfer surface (**16**) of said heat sink for transferring heat away from said heat sink to surrounding air,

a housing (**56**) covering and spaced from said heat transfer surface (**16**) and said fins (**32**) for shielding said elongated sections (**18**), and wherein said housing (**56**) includes a back wall (**58**) extending between open ends (**60**) and spaced from said fins (**32**) and side walls (**62**) extending transversely from said back wall (**58**) to said elongated sections (**18**) to define a U-shape in cross section extending between said open ends (**60**) for allowing air to flow along said fins (**32**) and through said housing (**56**).

16. A method of manufacturing a light emitting assembly (**10**) of the type including a plurality of L.E.D.s (**24**) disposed on the mounting surface (**14**) of a heat sink defined by independent elongated sections (**18**), and

comprising the steps of:

extruding a continuous strip of the heat sink having a cross section (**18**) presenting the mounting surface (**14**) and the heat transfer surface (**16**) and fins (**32**) extending from the heat transfer surface (**16**),

cutting the strip of heat sink into a plurality of elongated sections (**18**) extending between ends (**22**),

disposing the L.E.D.s (**24**) on the mounting surface (**14**) of each elongated section (**18**),

disposing the elongated sections (**18**) in generally parallel relationship to one another to present side edges (**20**) extending between the ends (**22**) and along adjacent edges (**20**) of the elongated sections (**18**), and

interconnecting the adjacent elongated sections (**18**) with at least one bridge (**28**, **128**) to maintain the elongated sections (**18**) connected together.

17. A method of manufacturing a light emitting assembly (**10**) of the type including a plurality of L.E.D.s (**24**) disposed on the mounting surface (**14**) of a thermally conductive heat sink defined by independent elongated sections (**18**), and

comprising the steps of:

forming a continuous strip of the heat sink having a cross section presenting the mounting surface (**14**),

dividing the strip of heat sink into a plurality of elongated sections (**18**) extending between ends (**22**),

disposing the L.E.D.s (**24**) on the mounting surface (**14**) of each elongated section (**18**), and

disposing the elongated sections (**18**) in generally parallel relationship to one another to present side edges (**20**) extending between the ends (**22**) and along adjacent edges (**20**) of the sections (**18**).

18. A method as set forth in claim **17** further comprising interconnecting the adjacent elongated sections (**18**) with at least one bridge (**28**, **128**) extending transversely between adjacent elongated sections (**18**).

19. A method as set forth in claim **17** further comprising spacing the elongated sections (**18**) apart from one another so that the side edges (**20**) of adjacent elongated sections (**18**) define an elongated slot (**26**) separating and rendering adjacent elongated sections (**18**) and the L.E.D.s (**24**) on the mounting surface (**14**) thereof independent of one another.

20. A method as set forth in claim **17** further comprising forming a plurality of fins (**32**) integral with the extruded heat sink and extending transversely from the heat transfer surface (**16**) facing in the opposite direction from the mounting surface (**14**) of the heat sink and disposed in spaced and parallel relationship to one another.

21. A method as set forth in claim **20** further comprising disposing a housing (**56**) over and spaced from the heat transfer surface (**16**) and the fins (**32**) for shielding the elongated sections (**18**).

22. A method as set forth in claim **20** wherein said forming a heat sink is further defined as forming a pair of side ribs (**38**) extending radially from the heat transfer surface (**16**) to the fins (**32**) to present a second void space (**40**) between the heat transfer surface (**16**) and each of the side ribs (**38**) and the fins (**32**) and extending longitudinally between the ends (**22**) of each of the sections (**18**) for transferring heat away from the heat sink to ambient air.

23. A method as set forth in claim **20** wherein said forming a heat sink is further defined as forming the mounting surface (**14**) on each of the elongated sections (**18**) at an angle other than ninety degrees relative to the parallel fins (**32**) thereof.

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